

What is claimed is:

1. A stacked foil thrust bearing assembly for use in high speed rotating machines comprising:
  - a plurality of thrust runners in adjacently spaced and parallel relationship, each thrust runner including an annular-shaped portion having generally opposite axial sides;
  - a thrust bearing positioned on each axial side of the thrust runners, each thrust bearing including a thrust bearing plate and a spring plate operatively engaging the thrust bearing plate.
2. The stacked foil thrust bearing assembly of claim 1, each thrust bearing plate being annular-shaped and having two opposite axial sides, and further including a plurality of foils circumaxially dispersed about one axial side of the thrust bearing plate.
3. The stacked foil thrust bearing assembly of claim 2, wherein each foil has a leading edge that is secured to the thrust bearing plate and a trailing edge that is not secured.
4. The stacked foil thrust bearing assembly of claim 3, said foils being compliant.
5. The stacked foil thrust bearing assembly of claim 3, wherein each thrust bearing plate is adjacent the axial sides of the thrust runner so that the one axial side of each thrust bearing plate is in confronting relationship with the thrust runner.
6. The stacked foil thrust bearing assembly of claim 2, each thrust bearing plate including a plurality of decoupled bearing segments defined in part by a plurality of lines of weakness circumaxially dispersed about the thrust bearing plate.

7. The stacked foil thrust bearing assembly of claim 1, each spring plate being annular-shaped and having two opposite axial sides, and further including a plurality of springs circumaxially dispersed about one axial side of the spring plate.
8. The stacked foil thrust bearing assembly of claim 7, wherein the springs are leaf springs.
9. The stacked foil thrust bearing assembly of claim 8, wherein the one axial side about which the leaf springs are dispersed is opposite from the thrust bearing plate.
10. The stacked foil thrust bearing assembly of claim 7, each spring plate including a plurality of decoupled bearing segments defined in part by a plurality of lines of weakness circumaxially dispersed about the spring plate.
11. The stacked foil thrust bearing assembly of claim 1, each thrust runner having an individual hub, the hubs of adjacent thrust runners being operatively coupled together.
12. A stacked foil thrust bearing assembly for use in high speed rotating machines, comprising:
  - a plurality of thrust runners in adjacently spaced and parallel relationship and having annular thrust-carrying surfaces, the thrust-carrying surfaces of each runner facing in the same axial direction;
  - a thrust bearing plate adjacent the annular thrust-carrying surface of each thrust runner, each thrust bearing plate having two opposite axial sides and including on one axial side a plurality of foils in confronting relationship with the thrust-carrying surface of the thrust runner; and
  - a spring plate adjacent the axial side of each thrust bearing plate opposite said one side, said spring plate including a plurality of springs.

13. The stacked foil thrust bearing assembly of claim 12, wherein each thrust runner of the plurality has two annular thrust-carrying surfaces facing in opposite axial directions, wherein one thrust bearing plate is disposed with foils adjacent to each annular thrust-carrying surface of each thrust runner, and one spring plate operatively engages each thrust bearing plate.
14. The stacked foil thrust bearing assembly of claim 12, wherein the foils are circumaxially dispersed about each thrust bearing plate.
15. The stacked foil thrust bearing assembly of claim 14, wherein each foil has a leading edge that is secured to the thrust bearing plate and a trailing edge that is not secured.
16. The stacked foil thrust bearing assembly of claim 15, said foils being compliant.
17. The stacked foil thrust bearing assembly of claim 12, wherein the springs on each spring plate are circumaxially dispersed thereabout.
18. The stacked foil thrust bearing assembly of claim 17, wherein the springs are leaf springs.
19. The stacked foil thrust bearing assembly of claim 18, each spring plate having two opposite sides including one side opposite from the adjacent thrust bearing plate, wherein the leaf springs are dispersed about said one side.
20. The stacked foil thrust bearing assembly of claim 12, each thrust runner having an individual hub, the hubs of adjacent thrust runners being operatively coupled together.

21. A stacked foil thrust bearing assembly for use in high speed rotating machines, comprising:
- a plurality of thrust runners in spaced and parallel relationship for rotation about an axis of rotation of the bearing assembly, each thrust runner having at least one thrust-carrying surface, the thrust-carrying surfaces of each runner facing in the same axial direction; and
  - a plurality of foil thrust bearings cooperating respectively with the thrust-carrying surfaces of the plurality of thrust runners for transmitting thrust loads through the assembly in a distributed fashion.
22. The stacked foil thrust bearing assembly of claim 21, wherein
- the plurality of thrust runners are disposed in spaced and parallel relationship along a rotatable shaft in the assembly,
  - the thrust-carrying surfaces are annular surfaces circumscribing the rotatable shaft; and
  - the plurality of foil thrust bearings include thrust plates circumscribing the rotatable shaft adjacent the respective annular thrust-carrying surfaces of the thrust runners.